

Civil & Environmental Engineering 141
Design of Steel Structures

UCLA CEE 141 – STRUCTURAL STEEL DESIGN

Today's Lecture

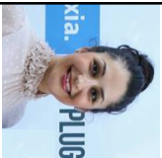
- Introductions
- Course Overview
- Introduction to Structural Engineering Practice
- Construction of Steel Structures

UCLA CEE 141 – STRUCTURAL STEEL DESIGN

INTRODUCTIONS

Instructors

- Kane Pithey, SE - Lecturer
- Elham Moore, PE- TA
- Shahrzad Dastmalchi- TA



Ellie Moore, P.E.
Email: elhammoore@ucla.edu
❖ [University of California, Los Angeles](#)
PhD student in Structural/Earthquake Engineering, *Fall 2014-Present*
❖ [University of Southern California, Los Angeles](#)
Master in Building Science/Structural Engineering, 2010
❖ [Sharif University of Technology, Iran](#)
Bachelor's in Civil Engineering, 2005
❖ [3rd year TA at UCLA](#)
❖ [8 years of industry experience](#): including new building design (i.e. Disney Star Wars Land), seismic evaluation & retrofit of existing buildings, & specialty structures (wind tower foundation)



Shahrzad Dastmalchi
Email: shdstm@ucla.edu
❖ [University of California, Los Angeles](#)
PhD student in Structural/Earthquake Engineering, *Fall 2014-Present*
❖ [University of Maryland, College Park](#)
Master's in Structural Engineering, 2012
❖ [University of Tehran, Iran](#)
Master's in Earthquake Engineering, 2006
❖ [Iran University of Science and Technology, Iran](#)
Bachelor's in Civil Engineering, *Fall 2007*
❖ [3rd year TA at UCLA](#)

Kane Pithey



- Licensed Structural and Civil Engineer in California
- 11 years in structural design
- Associate at KPFF Consulting Engineers, LA Office
- BS Civil Engineering from University of Notre Dame
- MS Structural/Earthquake Engineering from UCLA
- Notable Projects: UCSD Outpatient, Sharp Grossmont Hospital, J. Craig Venter Institute, 68th Street School, Southwest Justice Center



HCA Riverside



HCA Riverside



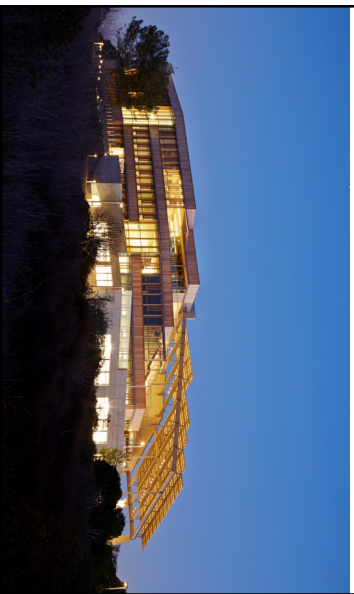
UCSD Outpatient Pavilion



UCSD Outpatient Pavilion



J. Craig Venter Institute



UCLA Terasaki Hall



UCLA Franz Hall Tower



COURSE OVERVIEW

Syllabus

October 1 2018

UCLA Civil and Environmental Engineering

CEE 141 - Steel Structures

Course Syllabus

Fall 2018

Course Description

Lecture, four hours; discussion, two hours; outside study, six hours. Prerequisite: course 133A. Introduction to building codes. Fundamentals of load and resistance factor design of steel elements. Design of tension and compression members. Design of welded and bolted connections. Design of moment-resisting frames. Introduction to computer modeling methods and design process. Letter grading.

The primary objective of the course is to provide the student with a solid background in the fundamentals of structural steel design. Steel will be used for typical civil engineering structures such as trusses, bridges, and buildings. The course will cover the design of steel members, connections, and frames. The course will also cover the design of steel structures for seismic, wind, and other loads. The course will cover the design of steel structures for fire, corrosion, and other factors. At the end of the course, the student will be able to size basic steel elements and connections needed to assemble typical structures.

Posted online on CCE site

Lecture Format

- Lecture notes posted to CCLE prior to class for use in note taking
- 10 minute break after first half
- Homework due at start of class
- Example problems will be posted to CCLE after lecture

CCLE Web Site

- Lecture notes posted prior to lecture
- Example problems posted after lecture
- Additional readings/references
- Homework assignments & solutions
- Project assignment materials
- Class calendar
- Discussion Forum for assignment clarifications, etc.

Instructor Office Hours

- Office Hours
 - In Person: Wednesday 10-11 AM
 - 5732 (TBD)
- Online: Monday 8-9 PM
 - Hosted through GoTo Meeting
 - Recurring invite will be posted on CCLE
- TA Office Hours TBD

Discussion Forum

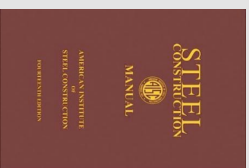
- Emailed questions about class material or assignments will not be answered.
- Post these types of questions to the Discussion Forum on CCLE.

UCLA CEE 141 – STRUCTURAL STEEL DESIGN

Required Texts



**"Unified Design of Steel Structures,
Second Edition"**
Luis F. Geschwindner



"Steel Design Manual, 14th Edition"
American Institute of Steel
Construction

UCLA CEE 141 – STRUCTURAL STEEL DESIGN

Class Schedule

Global Initiatives					
Project Overview		Project Management		Project Progress	
Project Name	Manager	Start Date	End Date	Status	Progress (%)
Project A: New Product Development	John Doe	2023-01-15	2023-06-30	On Track	85%
	Jane Smith	2023-02-01	2023-07-15	Delayed	60%
	Mike Johnson	2023-03-10	2023-08-01	On Track	90%
	Sarah Lee	2023-04-05	2023-08-15	At Risk	45%
	David Kim	2023-05-01	2023-09-01	On Track	70%
Project B: Market Expansion		2023-06-01	2023-12-31	On Track	50%
Project C: Customer Satisfaction Initiative		2023-07-01	2024-03-31	On Track	30%
Project D: Internal Process Optimization		2023-08-01	2024-06-30	On Track	20%
Project E: Sustainability Report Development		2023-09-01	2023-11-30	On Track	10%
Project F: Employee Training Program		2023-10-01	2024-01-31	On Track	5%
Project G: Website Redesign		2023-11-01	2024-04-30	On Track	0%
Project H: Data Analytics Implementation		2023-12-01	2024-05-31	On Track	0%
Project I: Compliance Audit Preparation		2024-01-01	2024-03-31	On Track	0%
Project J: New Market Research		2024-02-01	2024-06-30	On Track	0%
Project K: Supply Chain Optimization		2024-03-01	2024-09-30	On Track	0%
Project L: HR System Upgrade		2024-04-01	2024-12-31	On Track	0%
Project M: IT Security Enhancement		2024-05-01	2025-01-31	On Track	0%
Project N: Marketing Campaign Launch		2024-06-01	2025-02-28	On Track	0%
Project O: Financial Reporting Automation		2024-07-01	2025-03-31	On Track	0%
Project P: Customer Feedback Loop Implementation		2024-08-01	2025-04-30	On Track	0%
Project Q: Product Line Extension		2024-09-01	2025-05-31	On Track	0%
Project R: Global Expansion Strategy		2024-10-01	2025-06-30	On Track	0%
Project S: Innovation Pipeline Development		2024-11-01	2025-07-31	On Track	0%
Project T: Talent Acquisition Initiative		2024-12-01	2025-08-31	On Track	0%
Project U: Sustainability Reporting Framework		2025-01-01	2025-09-30	On Track	0%
Project V: Digital Transformation Project		2025-02-01	2025-10-31	On Track	0%
Project W: Compliance Training Program		2025-03-01	2025-11-30	On Track	0%
Project X: New Product Launch Preparation		2025-04-01	2025-12-31	On Track	0%
Project Y: Customer Segmentation Analysis		2025-05-01	2026-01-31	On Track	0%
Project Z: Supply Chain Risk Assessment		2025-06-01	2026-02-28	On Track	0%
Project AA: Internal Audit Review		2025-07-01	2026-03-31	On Track	0%
Project AB: Employee Wellness Program		2025-08-01	2026-04-30	On Track	0%
Project AC: Data Privacy Policy Update		2025-09-01	2026-05-31	On Track	0%
Project AD: Marketing Automation Setup		2025-10-01	2026-06-30	On Track	0%
Project AE: HR Policy Review		2025-11-01	2026-07-31	On Track	0%
Project AF: IT Infrastructure Upgrade		2025-12-01	2026-08-31	On Track	0%
Project AG: Sustainability Initiative Launch		2026-01-01	2026-09-30	On Track	0%
Project AH: Customer Service Training		2026-02-01	2026-10-31	On Track	0%
Project AI: Product Development Phase 2		2026-03-01	2026-11-30	On Track	0%
Project AJ: Global Market Entry Strategy		2026-04-01	2026-12-31	On Track	0%
Project AK: Compliance Training Module 2		2026-05-01	2027-01-31	On Track	0%
Project AL: New Product Launch Phase 2		2026-06-01	2027-02-28	On Track	0%
Project AM: Customer Feedback Loop Phase 2		2026-07-01	2027-03-31	On Track	0%
Project AN: Supply Chain Optimization Phase 2		2026-08-01	2027-04-30	On Track	0%
Project AO: Internal Audit Review Phase 2		2026-09-01	2027-05-31	On Track	0%
Project AP: Employee Wellness Program Phase 2		2026-10-01	2027-06-30	On Track	0%
Project AQ: Data Privacy Policy Update Phase 2		2026-11-01	2027-07-31	On Track	0%
Project AR: Marketing Automation Setup Phase 2		2026-12-01	2027-08-31	On Track	0%
Project AS: HR Policy Review Phase 2		2027-01-01	2027-09-30	On Track	0%
Project AT: IT Infrastructure Upgrade Phase 2		2027-02-01	2027-10-31	On Track	0%
Project AU: Sustainability Initiative Launch Phase 2		2027-03-01	2027-11-30	On Track	0%
Project AV: Customer Service Training Phase 2		2027-04-01	2027-12-31	On Track	0%
Project AW: Product Development Phase 3		2027-05-01	2028-01-31	On Track	0%
Project AX: Global Market Entry Phase 2		2027-06-01	2028-02-28	On Track	0%
Project AY: Compliance Training Module 3		2027-07-01	2028-03-31	On Track	0%
Project AZ: New Product Launch Phase 3		2027-08-01	2028-04-30	On Track	0%
Project BA: Customer Feedback Loop Phase 3		2027-09-01	2028-05-31	On Track	0%
Project BB: Supply Chain Optimization Phase 3		2027-10-01	2028-06-30	On Track	0%
Project BC: Internal Audit Review Phase 3		2027-11-01	2028-07-31	On Track	0%
Project BD: Employee Wellness Program Phase 3		2027-12-01	2028-08-31	On Track	0%
Project BE: Data Privacy Policy Update Phase 3		2028-01-01	2028-09-30	On Track	0%
Project BF: Marketing Automation Setup Phase 3		2028-02-01	2028-10-31	On Track	0%
Project BG: HR Policy Review Phase 3		2028-03-01	2028-11-30	On Track	0%
Project BH: IT Infrastructure Upgrade Phase 3		2028-04-01	2028-12-31	On Track	0%
Project BI: Sustainability Initiative Launch Phase 3		2028-05-01	2029-01-31	On Track	0%
Project BJ: Customer Service Training Phase 3		2028-06-01	2029-02-28	On Track	0%
Project BK: Product Development Phase 4		2028-07-01	2029-03-31	On Track	0%
Project BL: Global Market Entry Phase 3		2028-08-01	2029-04-30	On Track	0%
Project BM: Compliance Training Module 4		2028-09-01	2029-05-31	On Track	0%
Project BN: New Product Launch Phase 4		2028-10-01	2029-06-30	On Track	0%
Project BO: Customer Feedback Loop Phase 4		2028-11-01	2029-07-31	On Track	0%
Project BP: Supply Chain Optimization Phase 4		2028-12-01	2029-08-31	On Track	0%
Project BQ: Internal Audit Review Phase 4		2029-01-01	2029-09-30	On Track	0%
Project BR: Employee Wellness Program Phase 4		2029-02-01	2029-10-31	On Track	0%
Project BS: Data Privacy Policy Update Phase 4		2029-03-01	2029-11-30	On Track	0%
Project BT: Marketing Automation Setup Phase 4		2029-04-01	2029-12-31	On Track	0%
Project BU: HR Policy Review Phase 4		2029-05-01	2030-01-31	On Track	0%
Project BV: IT Infrastructure Upgrade Phase 4		2029-06-01	2030-02-28	On Track	0%
Project BW: Sustainability Initiative Launch Phase 4		2029-07-01	2030-03-31	On Track	0%
Project BX: Customer Service Training Phase 4		2029-08-01	2030-04-30	On Track	0%
Project BY: Product Development Phase 5		2029-09-01	2030-05-31	On Track	0%
Project BZ: Global Market Entry Phase 4		2029-10-01	2030-06-30	On Track	0%
Project CA: Compliance Training Module 5		2029-11-01	2030-07-31	On Track	0%
Project CB: New Product Launch Phase 5		2029-12-01	2030-08-31	On Track	0%
Project CC: Customer Feedback Loop Phase 5		2030-01-01	2030-09-30	On Track	0%
Project CD: Supply Chain Optimization Phase 5		2030-02-01	2030-10-31	On Track	0%
Project CE: Internal Audit Review Phase 5		2030-03-01	2030-11-30	On Track	0%
Project CF: Employee Wellness Program Phase 5		2030-04-01	2030-12-31	On Track	0%
Project CG: Data Privacy Policy Update Phase 5		2030-05-01	2031-01-31	On Track	0%
Project CH: Marketing Automation Setup Phase 5		2030-06-01	2031-02-28	On Track	0%
Project CI: HR Policy Review Phase 5		2030-07-01	2031-03-31	On Track	0%
Project CJ: IT Infrastructure Upgrade Phase 5		2030-08-01	2031-04-30	On Track	0%
Project CK: Sustainability Initiative Launch Phase 5		2030-09-01	2031-05-31	On Track	0%
Project CL: Customer Service Training Phase 5		2030-10-01	2031-06-30	On Track	0%
Project CM: Product Development Phase 6		2030-11-01	2031-07-31	On Track	0%
Project CN: Global Market Entry Phase 5		2030-12-01	2031-08-31	On Track	0%
Project CO: Compliance Training Module 6		2031-01-01	2031-09-30	On Track	0%
Project CP: New Product Launch Phase 6		2031-02-01	2031-10-31	On Track	0%
Project CQ: Customer Feedback Loop Phase 6		2031-03-01	2031-11-30	On Track	0%
Project CR: Supply Chain Optimization Phase 6		2031-04-01	2031-12-31	On Track	0%
Project CS: Internal Audit Review Phase 6		2031-05-01	2032-01-31	On Track	0%
Project CT: Employee Wellness Program Phase 6		2031-06-01	2032-02-28	On Track	0%
Project CU: Data Privacy Policy Update Phase 6		2031-07-01	2032-03-31	On Track	0%
Project CV: Marketing Automation Setup Phase 6		2031-08-01	2032-04-30	On Track	0%
Project CW: HR Policy Review Phase 6		2031-09-01	2032-05-31	On Track	0%
Project CX: IT Infrastructure Upgrade Phase 6		2031-10-01	2032-06-30	On Track	0%
Project CY: Sustainability Initiative Launch Phase 6		2031-11-01	2032-07-31	On Track	0%
Project CZ: Customer Service Training Phase 6		2031-12-01	2032-08-31	On Track	0%
Project DA: Product Development Phase 7		2032-01-01	2032-09-30	On Track	0%
Project DB: Global Market Entry Phase 6		2032-02-01	2032-10-31	On Track	0%
Project DC: Compliance Training Module 7		2032-03-01	2032-11-30	On Track	0%
Project DD: New Product Launch Phase 7		2032-04-01	2032-12-31	On Track	0%
Project DE: Customer Feedback Loop Phase 7		2032-05-01	2033-01-31	On Track	0%
Project DF: Supply Chain Optimization Phase 7		2032-06-01	2033-02-28	On Track	0%
Project DG: Internal Audit Review Phase 7		2032-07-01	2033-03-31	On Track	0%
Project DH: Employee Wellness Program Phase 7		2032-08-01	2033-04-30	On Track	0%
Project DI: Data Privacy Policy Update Phase 7		2032-09-01	2033-05-31	On Track	0%
Project DJ: Marketing Automation Setup Phase 7		2032-10-01	2033-06-30	On Track	0%
Project DK: HR Policy Review Phase 7		2032-11-01	2033-07-31	On Track	0%
Project DL: IT Infrastructure Upgrade Phase 7		2032-12-01	2033-08-31	On Track	0%
Project DM: Sustainability Initiative Launch Phase 7		2033-01-01	2033-09-30	On Track	0%
Project DN: Customer Service Training Phase 7		2033-02-01	2033-10-31	On Track	0%
Project DO: Product Development Phase 8		2033-03-01	2033-11-30	On Track	0%
Project DP: Global Market Entry Phase 7		2033-04-01	2033-12-31	On Track	0%
Project DQ: Compliance Training Module 8		2033-05-01	2034-01-31	On Track	0%
Project DR: New Product Launch Phase 8		2033-06-01	2034-02-28	On Track	0%
Project DS: Customer Feedback Loop Phase 8		2033-07-01	2034-03-31	On Track	0%
Project DT: Supply Chain Optimization Phase 8		2033-08-01	2034-04-30	On Track	0%
Project DU: Internal Audit Review Phase 8		2033-09-01	2034-05-31	On Track	0%
Project DV: Employee Wellness Program Phase 8		2033-10-01	2034-06-30	On Track	0%
Project DW: Data Privacy Policy Update Phase 8		2033-11-01	2034-07-31	On Track	0%
Project DX: Marketing Automation Setup Phase 8		2033-12-01	2034-08-31	On Track	0%
Project DY: HR Policy Review Phase 8		2034-01-01	2034-09-30	On Track	0%
Project DZ: IT Infrastructure Upgrade Phase 8		2034-02-01	2034-10-31	On Track	0%
Project EA: Sustainability Initiative Launch Phase 8		2034-03-01	2034-11-30	On Track	0%
Project EB: Customer Service Training Phase 8		2034-04-01	2034-12-31	On Track	0%
Project EC: Product Development Phase 9		2034-05-01	2035-01-31	On Track	0%
Project ED: Global Market Entry Phase 8		2034-06-01	2035-02-28	On Track	0%
Project EE: Compliance Training Module 9		2034-07-01	2035-03-31	On Track	0%
Project EF: New Product Launch Phase 9		2034-08-01	2035-04-30	On Track	0%
Project EG: Customer Feedback Loop Phase 9		2034-09-01	2035-05-31	On Track	0%
Project EH: Supply Chain Optimization Phase 9		2034-10-01	2035-06-30	On Track	0%
Project EI: Internal Audit Review Phase 9		2034-11-01	2035-07-31	On Track	0%
Project EJ: Employee Wellness Program Phase 9		2034-12-01	2035-08-31	On Track	0%
Project EK: Data Privacy Policy Update Phase 9		2035-01-01	2035-09-30	On Track	0%
Project EL: Marketing Automation Setup Phase 9		2035-02-01	2035-10-31	On Track	0%
Project EM: HR Policy Review Phase 9		2035-03-01	2035-11-30	On Track	0%
Project EN: IT Infrastructure Upgrade Phase 9		2035-04-01	2035-12-31	On Track	0%
Project EO: Sustainability Initiative Launch Phase 9		2035-05-01	2036-01-31	On Track	0%
Project EP: Customer Service Training Phase 9		2035-06-01	2036-02-28	On Track	0%
Project EQ: Product Development Phase 10		2035-07-01	2036-03-31	On Track	0%
Project ER: Global Market Entry Phase 9		2035-08-01	2036-04-30	On Track	0%
Project ES: Compliance Training Module 10		2035-09-01	2036-05-31	On Track	0%
Project ET: New Product Launch Phase 10		2035-10-01	2036-06-30	On Track	0%
Project EU: Customer Feedback Loop Phase 10		2035-11-01	2036-07-31	On Track	0%
Project EV: Supply Chain Optimization Phase 10		2035-12-01	2036-08-31	On Track	0%
Project EW: Internal Audit Review Phase 10		2036-01-01	2036-09-30	On Track	0%
Project EX: Employee Wellness Program Phase 10		2036-02-01	2036-10-31	On Track	0%
Project EY: Data Privacy Policy Update Phase 10		2036-03-01	2036-11-30	On Track	0%
Project EZ: Marketing Automation Setup Phase 10		2036-04-01	2036-12-31	On Track	0%
Project FA: HR Policy Review Phase 10		2036-05-01	2037-01-31	On Track	0%
Project FB: IT Infrastructure Upgrade Phase 10		2036-06-01	2037-02-28	On Track	0%
Project FC: Sustainability Initiative Launch Phase 10		2036-07-01	2037-03-31	On Track	0%
Project FD: Customer Service Training Phase 10		2036-08-01	2037-04-30	On Track	0%
Project FE: Product Development Phase 11		2036-09-01	2037-05-31	On Track	0%
Project FF: Global Market Entry Phase 10		2036-10-01	2037-06-30	On Track	0%
Project FG: Compliance Training Module 11		2036-11-01	2037-07-31	On Track	0%
Project FH: New Product Launch Phase 11		2036-12-01	2037-08-31	On Track	0%
Project FI: Customer Feedback Loop Phase 11		2037-01-01	2037-09-30	On Track	0%
Project FJ: Supply Chain Optimization Phase 11		2037-02-01	2037-10-31	On Track	0%
Project FK: Internal Audit Review Phase 11		2037-03-01	2037-11-30	On Track	0%
Project FL: Employee Wellness Program Phase 11		2037-04-01	2037-12-31	On Track	0%
Project FM: Data Privacy Policy Update Phase 11		2037-05-01	2038-01-31	On Track	0%
Project FN: Marketing Automation Setup Phase 11		2037-06-01	2038-02-28	On Track	0%
Project FO: HR Policy Review Phase 11		2037-07-01	2038-03-31	On Track	0%
Project FP: IT Infrastructure Upgrade Phase 11		2037-08-01	2038-04-30	On Track	0%
Project FQ: Sustainability Initiative Launch Phase 11		2037-09-01	2038-05-31	On Track	0%
Project FR: Customer Service Training Phase 11		2037-10-01	2038-06-30	On Track	0%
Project FS: Product Development Phase 12		2037-11-01	2038-07-31	On Track	0%
Project FT: Global Market Entry Phase 11		2037-12-01	2038-08-31	On Track	0%
Project FU: Compliance Training Module 12		2038-01-01	2038-09-30	On Track	0%
Project FV: New Product Launch Phase 12		2038-02-01	2038-10-31	On Track	0%
Project FW: Customer Feedback Loop Phase 12		2038-03-01	2038-11-30	On Track	0%
Project FX: Supply Chain Optimization Phase 12		2038-04-01	2038-12-31	On Track	0%
Project FY: Internal Audit Review Phase 12		2038-05-01	2039-01-31	On Track	0%
Project FZ: Employee Wellness Program Phase 12		2038-06-01	2039-02-28	On Track	0%
Project GA: Data Privacy Policy Update Phase 12		2038-07-01	2039-03-31	On Track	0%
Project GB: Marketing Automation Setup Phase 12		2038-08-01	2039-04-30	On Track	0%
Project GC: HR Policy Review Phase 12		2038-09-01	2039-05-31	On Track	0%
Project GD: IT Infrastructure Upgrade Phase 12		2038-10-01	2039-06-30	On Track	0%
Project GE: Sustainability Initiative Launch Phase 12		2038-11-01	2039-07-31	On Track	0%
Project GF: Customer Service Training Phase 12		2038-12-01	2039-08-31	On Track	0%
Project GH: Product Development Phase 13		2039-01-01	2039-09-30	On Track	0%
Project GI: Global Market Entry Phase 12		2			

Schedule will be maintained online on CCLE site

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

Grading Guidelines

• Homework	10%
• Project	30%
• Midterm	25%
• Final	35%

Project

- Will involve the design of steel framing for a building.
- Prepare full-size drawings and calculations.
- Quality of presentation is heavily weighted.
- Will be discussed in detail at 10/15 Lecture.
- **30% of final grade**
- First Assignment: **Due 10/5 (OPTIONAL)**
 - Team up with another student of your choosing
 - Submit your pair online using CCLE by Friday
- Project teams will be randomly assigned groups of 4.

Exams

- Hard copy of Steel Construction Manual will be only reference allowed during exams.
 - Your own handwritten notes within the SCM are acceptable.
- All solutions must utilize the 14th Edition of the SCM.
- Make up exams must be arranged **prior** to the exam dates and will only be accommodated under extraordinary circumstances.

Expectations

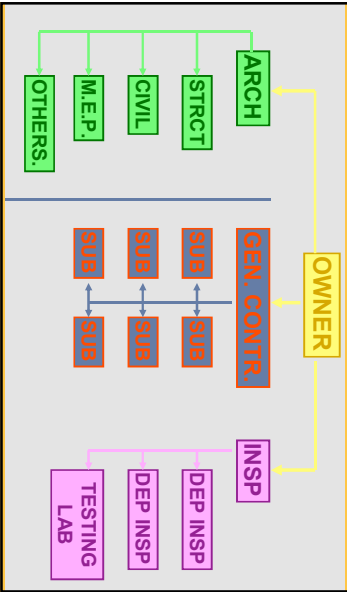
- Read assigned readings prior to lectures
- Attend lectures to listen and learn
- Bring AISI Manual to class
- Learn by doing homework
- Take pride in your project and get an early start
- Clear and logical presentation of your work matters
- Expect to be treated and expect to treat others as a professionals
- HW due at beginning of class
- No late work accepted
- Respect instructors' and TAs' time
- Be brave! Ask questions during class
- Don't rely on the forum for questions! Attend office hours and discussion section

Overview of Structural Engineering Practice

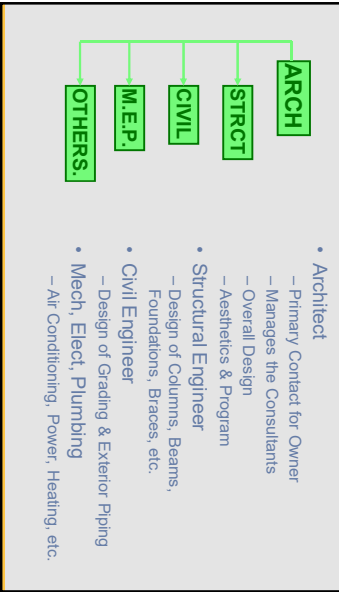
What Does a Structural Engineer Do?

- The structural engineer is part of a team of professionals hired to design or repair a building.
 - The design must be economical.
 - The design must be safe.
- The process of designing and constructing a building is complicated but it is critical to understand the process so you can understand the engineer's role.

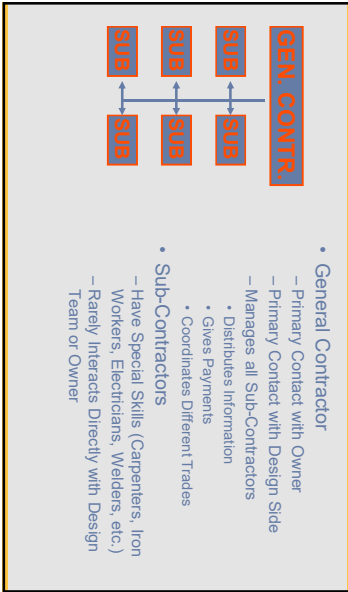
Project Structure



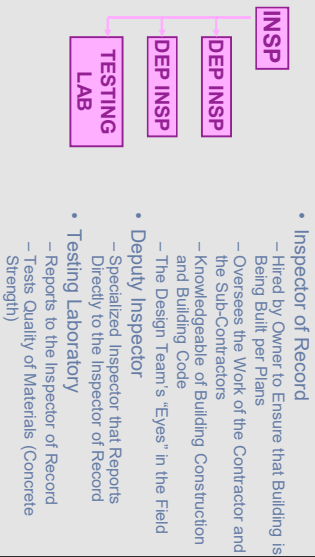
The Design Team



The Construction Team



Inspection



THE DESIGN PROCESS AND THE STRUCTURAL ENGINEER'S ROLE

The Structural Engineering Team

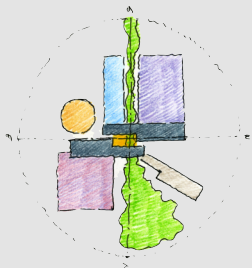
- Principal in Charge (PIC)
 - Usually has the previous client relationship/experience
 - Overall responsibility for the project
 - Selects and lays-out the structural systems
 - Reviews and signs structural drawings
 - Checks critical calculations
 - Financial responsibility
- Project Manager (PM)
 - Day to day responsibility for the project
 - Develops work plan and assigns staff
 - Assists in selection and layout of structural systems
 - Oversees creation of drawings and calculations
- Project Engineers (PE)
 - Responsible for specific engineering systems
 - Creates drawings, details and calculations for specific systems
- Design Engineers (DE)
 - Responsible for specific engineering tasks
 - Creates calculations to support design

Stages of Creating a Building

- Conceptual Design
- Schematic Design
- Design Development
- Construction Documents
- Approval
- Bidding
- Construction

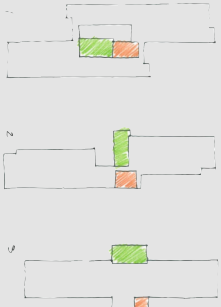
Conceptual Design

- Key Participants
 - Owner
 - Architect
 - Usually no Engineers
- Goals
 - Clarify the Owner's Needs
 - General size & location
 - Use
 - Total Cost
 - General aesthetic appearance



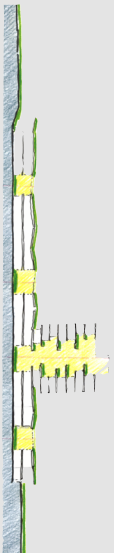
Conceptual Design

- Study Plan Configurations



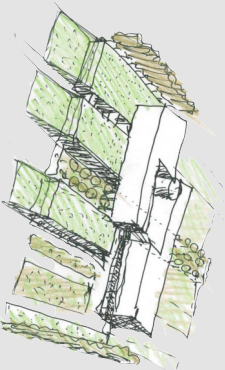
Conceptual Design

- Study Building in Section – Story Heights



Conceptual Design

- Study Massing



Schematic Design/Design Development

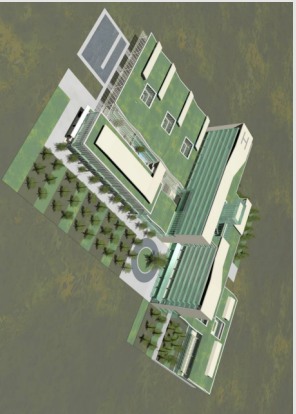
- Key Participants
 - Owner
 - Architect
 - Main Engineers (Structural, MEP, Civil)
- Goals
 - Develop Building Design
 - Floor plate, number of stories, story height
 - Column locations
 - Lateral system
 - More developed aesthetic appearance
 - Develop Design & Construction Schedule
 - Refine cost



Hand Renderings



Computer Renderings



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Small Scale Models



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Programming Diagrams



Lateral System

- Types
 - Steel
 - Braced Frame
 - Moment Frame
 - Shear Wall
 - Buckling Restrained Braced Frame
 - Concrete
 - Moment Frame
 - Shear Wall
 - Masonry
 - Shear Wall
 - Base Isolated
- Preliminary Computer Model

Steel Braced Frame



Steel Moment Frame



Concrete Shear Wall



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Base Isolation

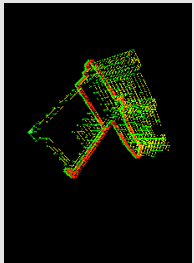


UCLA CEE 141 – STRUCTURAL STEEL DESIGN

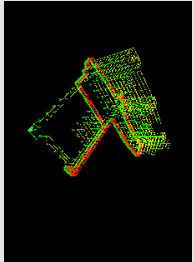
Preliminary Layout of Lateral System



Preliminary Computer Model



1st Mode: Long Direction



2nd Mode: Short Direction

Construction Documents

- Key Participants
 - Architect
 - Structural Engineer
 - MEP Engineer
 - Civil Engineer
 - Landscape Architect
 - Medical Planner
 - Equipment Consultant
 - Code Consultant
 - Telecommunications Engineer
 - Fire Alarm Consultant
 - Etc.
- Goals
 - Create Construction Documents
 - Plans
 - Details
 - Specifications
- THE CONSTRUCTION DOCUMENTS ARE OUR PRODUCT
- THE CALCULATIONS ARE MERELY A MEANS TO AN END
- NO ONE BUILDS OFF CALCULATIONS

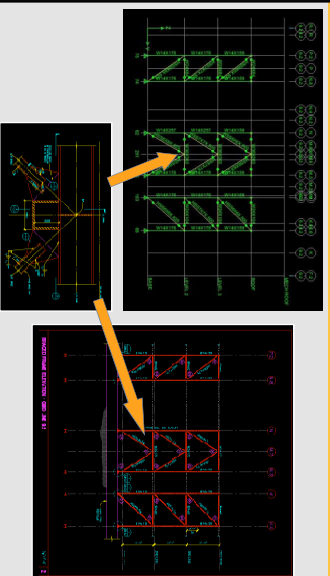
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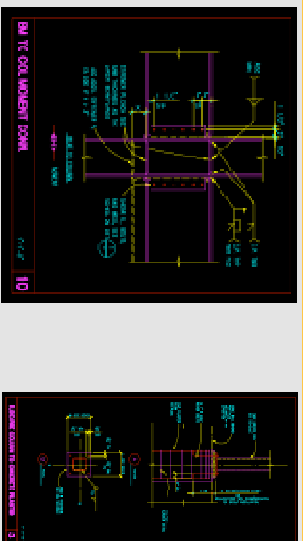
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Floor Plan on Structural Building Plans

Model to Drawing



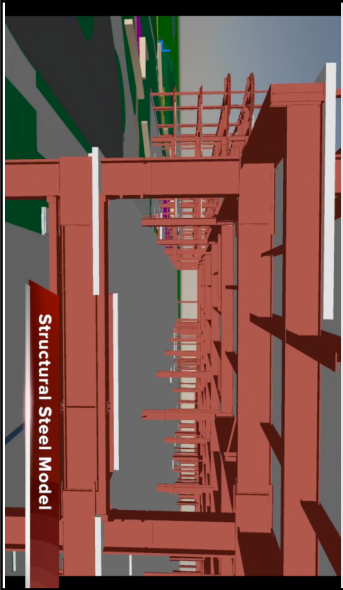
Details



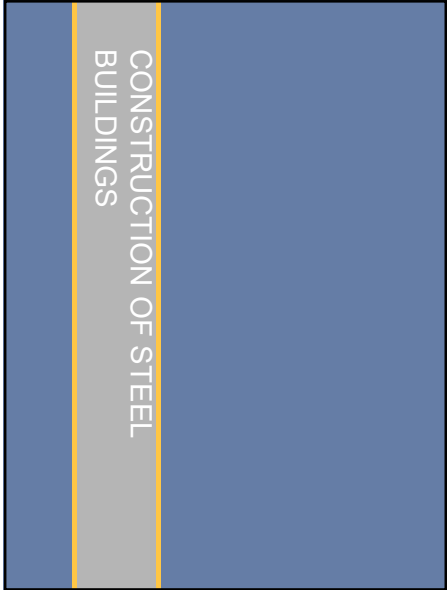
Building Information Modeling

- BIM involves a database of building components which can be utilized for definition and construction of the project:
 - 3D model/renderings
 - Cost models, Bill of materials
 - Construction scheduling
 - Analytical models
 - Coordination between trades

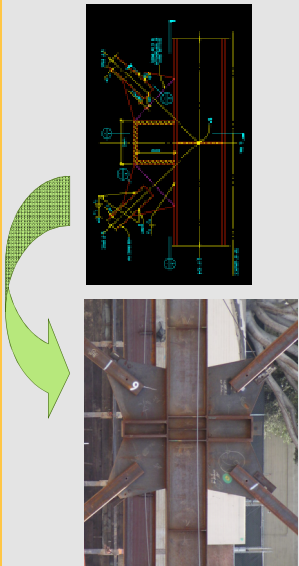
Building Information Modeling



CONSTRUCTION OF STEEL BUILDINGS



Building Construction



Steel Detailing and Fabrication



UCLA CEE 141 – STRUCTURAL STEEL DESIGN

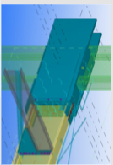
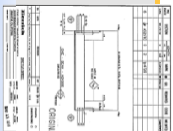
Steel Detailing and Fabrication



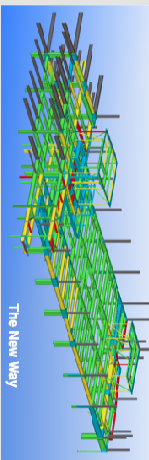
UCLA CEE 141 – STRUCTURAL STEEL DESIGN

Modern Detailing Practice

The Old Way



Color Legend:
Rebar & Fastener
Approved for Fabrication
Approved
User Input
Not to Scale



The New Way

UCLA CEE 141 – STRUCTURAL STEEL DESIGN

Steel Erection



UCLA CEE 141 – STRUCTURAL STEEL DESIGN

Steel Erection



Construction

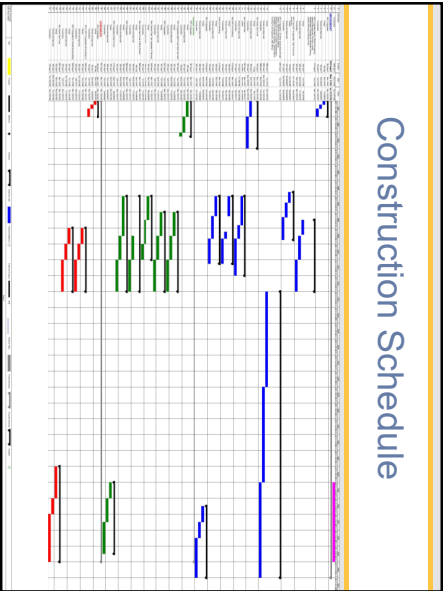
- Key Participants
 - Owner
 - Owner's Representative
 - Construction Manager
 - Design Team
 - Architect
 - Engineers
 - Builders
 - General Contractor
 - Sub-Contractors
 - Inspectors
- Goals
 - BUILD IT ON TIME AND ON BUDGET**
 - Communication is the key
 - Construction Meetings
 - Requests for Information (RFI)
 - Submittals
 - Site Visits
 - Inspections
 - Test Reports
 - Change Orders

UCLA CEE 141 – STRUCTURAL STEEL DESIGN

Construction Budget

Spreadsheet Level	Takeoff Quantity	Total Quantity	Total Amount	Notes
04.4. Labor Hours				
01.000.00 CONSULTING	724,260.00 hr	3.64 hr	4,403.91 \$	
02.000.00 PRELIMINARY DESIGN	724,260.00 hr	102.72 hr	7,014.61 \$	
03.000.00 ARCHITECTURAL	724,260.00 hr	9.87 hr	7,224.17 \$	
04.000.00 ELECTRICAL	724,260.00 hr	44.98 hr	3,181.79 \$	
05.000.00 MECHANICAL	724,260.00 hr	48.98 hr	3,181.89 \$	
06.000.00 PLUMBING & PROCESS PIPING	724,260.00 hr	64.41 hr	4,602.76 \$	
07.000.00 CIVIL	724,260.00 hr	3.60 hr	2,430.00 \$	
08.000.00 PAVING	724,260.00 hr	11.36 hr	2,330.00 \$	
09.000.00 SPECIAL REQUIREMENTS	724,260.00 hr	572.06 hr	414,316.25 \$	
04.01 New Hops				
Partial Totals				
Totals				
Labor	Amount	Rate		
Subcontract	414,316.25 \$	572.05 /hr		
Equipment	414,316.25 \$	872.03 /hr		
Overhead	8,286.32 \$	2.00 %		
Bond	20,562.18 \$	7.00 %		
Design Contingency	58,784.01 \$	13.00 %		
Exclusion				
Grand Total			706,89.47 \$	

Construction Schedule



Construction Schedule

